



**International
Academy of
Astronautics**

International Academy of Astronautics

IAA Committee on Space Debris

Paris, March 19th, 2014



Agenda

1. IAA Committee on Space Debris
2. Lessons learned from Beijing 2013
3. Status of Space Debris Symposium for Toronto 2014
4. Preparation of Space Debris Symposium for Jerusalem 2015
5. Actions
6. Information



1. IAA Committee on Space Debris

**Follow-up of the IAA meetings held since 1991
Officially created as Permanent Committee within IAA in 2012**

Terms of Reference (synthesis):

Scope

The IAA Committee on Space Debris is in charge of the coordination of all activities related to Space Debris within the Academy, covering the complete span of related topics including but not limited to: measurements, modeling, risk assessment in space and on the ground, reentry, hypervelocity impacts and protection, mitigation and standards, legal and policy, Active Debris Removal and Space Surveillance..

As such, its main tasks are:

- **Organization of the IAA Symposium on Space Debris A6 for the International Astronautical Congress**, mainly identification of the proposed sessions including scope, chairs and rapporteurs, proposals for joint sessions with other symposia, proposals for Keynote Lectures within the A6 Symposium, or Highlight Lectures in the more general IAC frame,
- **Organization of any stand-alone conference on Space Debris on behalf the Academy**, including nomination of the Program Committee,



1. IAA Committee on Space Debris

Terms of Reference (recall):

its main tasks are (ctd):

- **Coordination of the Academy sponsoring, participation and contribution to selected conferences dedicated to Space Debris**, such as for instance the ESA Darmstadt Conference,
- **Coordination of the Space Debris contribution in conferences not dedicated to Space Debris, but where some sessions may be devoted to the topic, sponsored by the Academy,**
- **Identification of potential studies on Space Debris** within Commission V or coordinated with any other Academy Commission, proposal of associated Cosmic Study and proposal for the corresponding Study Group,
- **Dissemination of information among the members of the Technical Committee**, mainly during regular TC meetings taking place twice a year, before the IAC and during the IAA March meetings in Paris. During these meetings, general information concerning past activities at international level on Space Debris shall be shared among the members, including debriefings from past conferences and major related actions (for instance IADC, COSPAR...). Practical aspects of the preparation of the upcoming Conferences, Symposia, Sessions are also dealt with during these meetings.



1. IAA Committee on Space Debris

Membership:

No need to be member of IAA !

- **Members of the IAA A6 Symposium Program Committee (chairs & rapporteurs)**
- **Members of the Program Committee of other IAA sponsored conferences with Space Debris concerns**
- **Members of Space Debris related working groups (IADC, UNCOPUOS, COSPAR, ISO ...)**
- **Academics, Labs, Universities, Industrials... working on the topic**

However, it is requested to be somehow “active”:

- **Participation to the meetings**
- **Debriefing of activities during the meetings**
- **Cross information with other members**

Two meetings per year:

- **One just before each year's IAC (Saturday is confirmed during the meeting)**
 - ↳ **Includes the status of the sessions, workshops, round tables... of the week**
- **One just before or during the IAC March Meeting in Paris**
 - ↳ **Includes the pre-selection of the abstracts for the following IAC**

Proposal to have a LinkedIn web zone:

- **Membership upon invitation = Committee membership**
- **Should enable efficient exchange between members**



1. IAA Committee on Space Debris

Official membership:

Co-Chairs:

Christophe Bonnal
Heiner Klinkrad
Nicholas L. Johnson

Committee Membership:

Patrick Seitzer,
Vladimir Agapov,
Thomas Schildknecht,
Luciano Anselmo,
Carsten Wiedemann,
Toshiya Hanada,
James Hyde,
Alessandro Francesconi,
Frank Schaefer,
Fernand Alby,
John Hussey,
Fabrizio Piergentili,
Darren McKnight,
Seishiro Kibe,
Michael Yakovlev,

MYS. Prasad,
Walter Flury,
Lubos Perek,
Eddy Van Breukelen,
T.S. Kelsko,
Holger Krag,
Carmen Pardini,
Sergey Meshcheryakov,
Richard Crowther,
V. Adimurthy,
Phillip Anz-Meador,
Vladimir Kouprianov,
Mark Mulrooney,
Gene Stansbery,
Paula Krisko,
Mark Matney,
Eric Christiansen,
Jer-Chyi Liou,
A.S. Ganeshan,
Hedley Stokes,
Yasuhiro Akahoshi,
G rard Brachet,
Bill Ailor



2. Lessons learned from Beijing 2013

SESSION ID	TECHNICAL SESSIONS	AUTHOR ATTENDANCE PER SYMPOSIUM	Min	Max	Papers	Papers	Notified	No	%	%	%
			Att	Att	Sched	Pres	Withdraw	Show	Papers Present.	No Show	Notified Withdrawn
	A6. SPACE DEBRIS										
A6.1.	Measurements		50	60	10	10	2	0	80%	0%	20%
A6.2.	Modeling and Risk Analysis		49	75	10	10	0	0	10%	0%	0%
A6.3.	Hypervelocity Impacts and Protection		22	34	11	8	0	3	73%	27%	0%
A6.4.	Mitigation and Standards		49	75	10	10	0	0	100%	0%	0%
A6.5.	Space Debris Removal Issues		65	90	10	8	2	0	80%	0%	20%
A6.6.	Political, Economic and Institutional Aspects of Space Debris Mitigation and Removal (Joint with Space Security)		61	75	11	7	3	1	64%	9%	27%
A6.7.	Space Debris Removal Concepts		39	72	8	7	1	0	88%	0%	12%
A6.8.	Political, Legal, Institutional and Economic Aspects of Space Debris Mitigation and Removal		25	40	9	7	2	0	78%	0%	22%
	TOTAL		360	521	79	67	10	4	72%	5%	13%

Statistics:

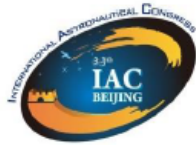
- Incomplete information for numerous Symposia
- Based on available information, 3rd most attended Symposia after C1 (Astrodynamics) and A3 (Space Exploration)
- Good work of the Chairs and Rapporteurs, with only 5% No-Show: best score of the Congress according to available information
- 16 papers proposed for publication in Acta Astronautica
- Note: it should have been a “low year” due to the 6th Darmstadt conference

Meeting of the Committee in Beijing on 21 September 2013:

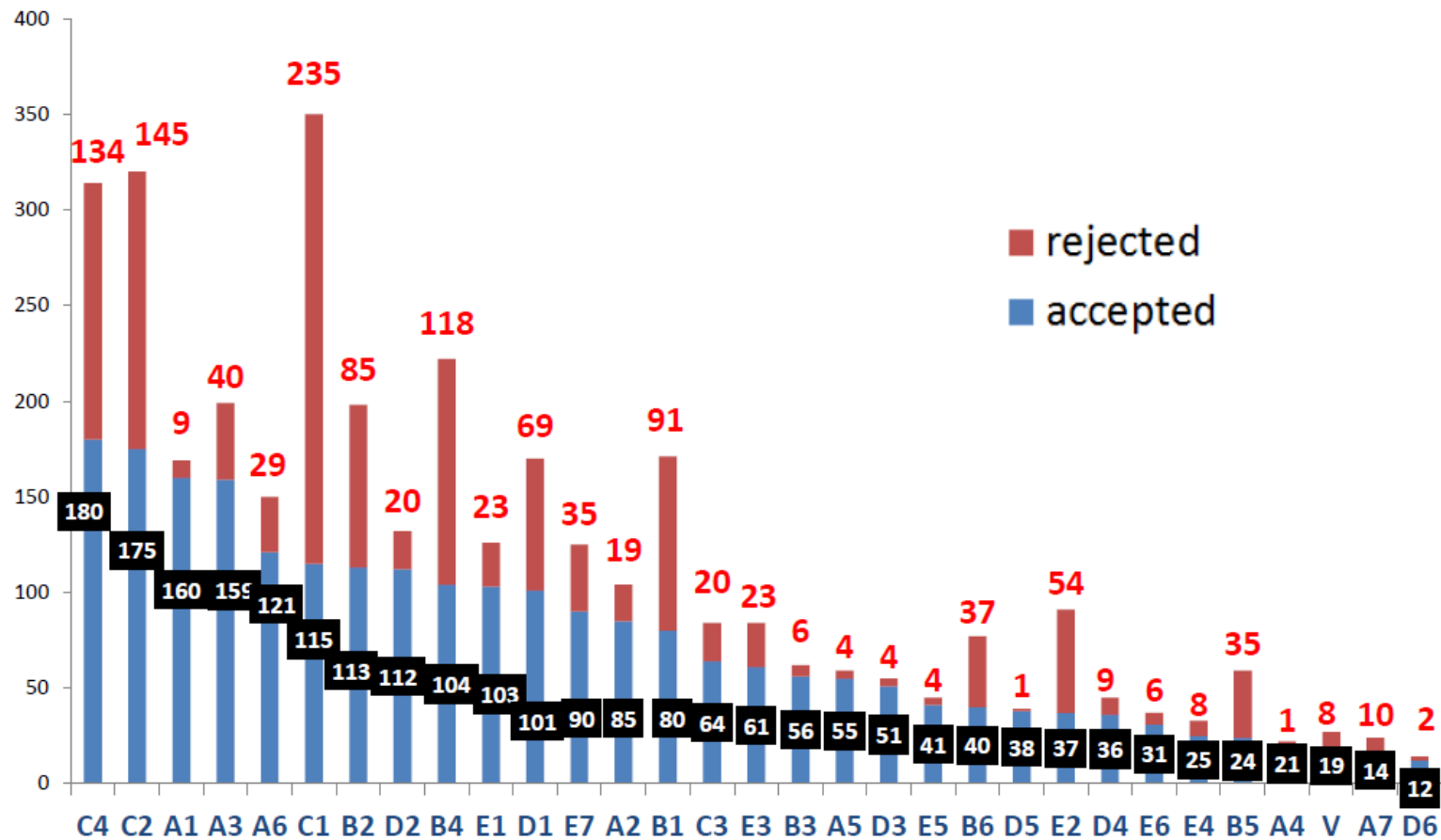
- Minutes are available on our page on the IAA web site (1 main document + 9 appendixes)

<http://iaaweb.org/content/view/487/655/>

2. Lessons learned from Beijing 2013



Results per Symposium: Accepted abstracts vs rejected abstracts

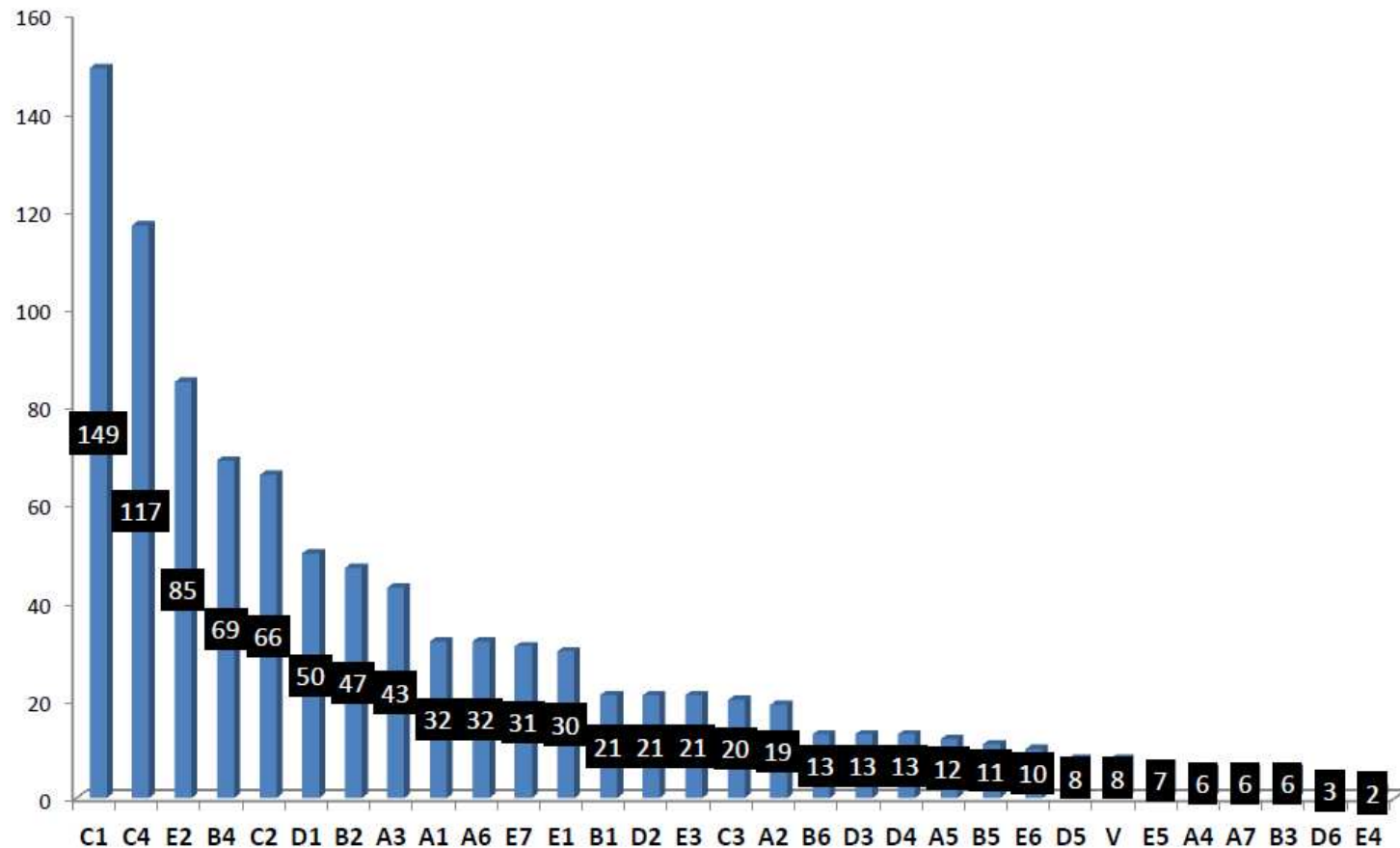




2. Lessons learned from Beijing 2013



Students Participation per Symposium





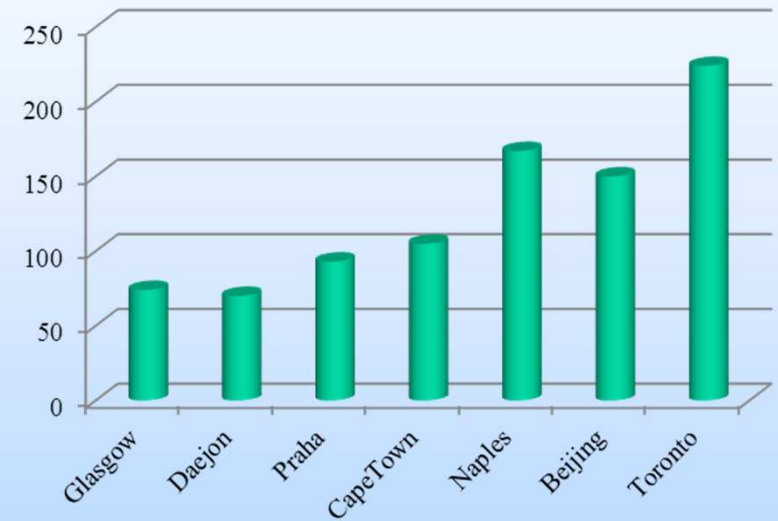
Record breaking number of submissions!

Ever increasing interest in this Symposium

- Total of 225 submissions for a theoretical maximum of 72 slots
 - ⇒ Theoretical need to reject 68% of the proposals
- Preliminary selection today
- Final selection tomorrow during IPC meeting

Good balance among sessions:

- A6.1: Measurements ⇒ 47 submissions
- A6.2: Modeling and Risk Analysis ⇒ 37 submissions
- A6.3: Hypervelocity Impacts and Protection ⇒ 24 submissions
- A6.4: Mitigation and Standards ⇒ 18 submissions
- A6.5: Space Debris Removal Issues ⇒ 29 submissions
- A6.6: Space Debris Removal Concepts ⇒ 37 submissions
- A6.7: Operations in Space Debris Environment, Situational Awareness ⇒ 13 submissions
- A6.8: (joint with Space Security Committee): Political, Legal, Institutional and Economic Aspects of Space Debris Mitigation and Removal ⇒ 18 submissions
- +2 not yet affected to specific session
 - ⇒ Will lead to the selection of numerous Posters
 - ⇒ Has led to the definition of a new Session A6.9 Modeling & Orbit Determination



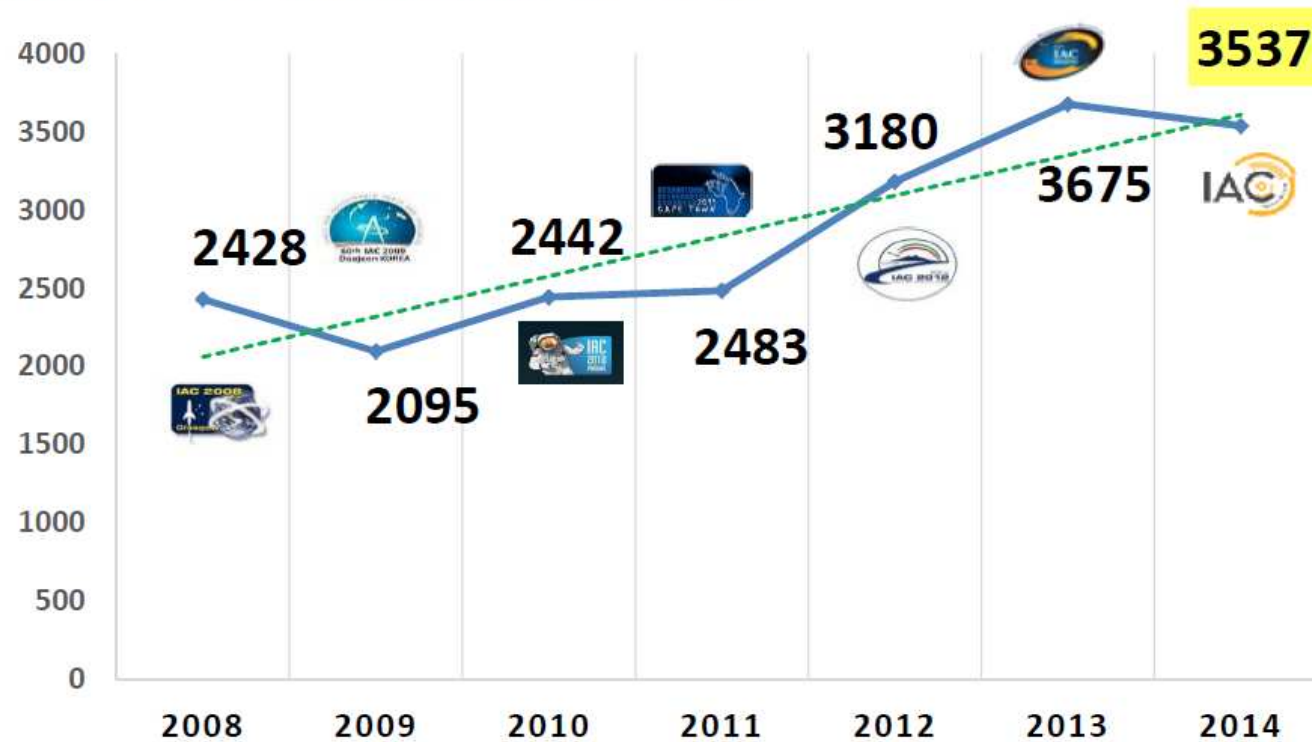


IAC Technical Programme Overview



•3,537 abstracts on 3 March 2014

-3,75% since Beijing, +14, 5% since Naples



Number of Abstracts Submitted: Evolution since 2008



IAC 2014 Abstract Submission: Repartition per Regional Group



NORTH AMERICA

342 abstracts (2 countries) –
9,7%

EUROPE

756 abstracts
(29 countries) –
21,4%

ASIA-PACIFIC

2291 abstracts
(24 countries) –
64,7%

LATIN AMERICAN AND CARIBBEAN

101 abstracts
(11 countries) –
2,9%

AFRICA

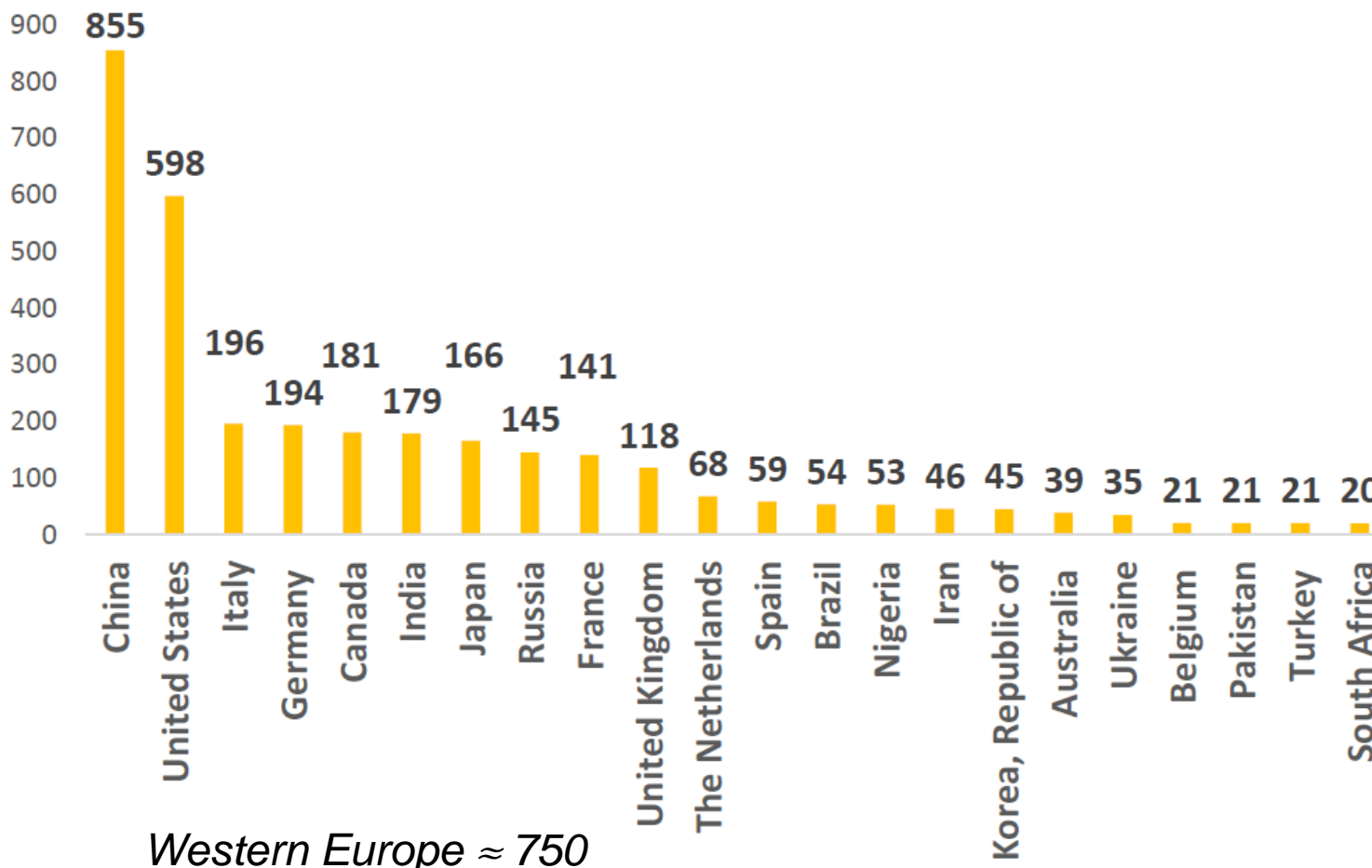
47 abstracts
(8 countries) –
1,3%



IAC 2014 Abstract Submission: Repartition per Country



International Astronautical Federation





3. Space Debris Symposium Toronto 2014



Sessions scheduling 2/2



International Astronautical Federation

Name	Cap	Monday PM	Tuesday AM	Tuesday PM	Wed AM	Wed PM	Thursday AM	Thursday PM	Friday AM	Friday PM
TS20	250	A31	A32A	A33B	A33A	A32B	A34	A35	A32C	A33C
TS19	120	D21	D22	D23	D24	D25	D26	D27	D28/A54	D29/D62
TS18	120	C11	C12	C13	C14	C15	C16	C17	C18	C19
TS17	120	A61	A62	A64	A63	A6.9	A65	A66	A67	A68/Spacesec
TS16	100	B42	B41	B43	B44	B45	B46B	B47A/B	B48	B46A
TS15	100	B11	B12	A51	B13	A52	B14	B15	B16	
TS14	100	B31	B32	B33	B34/B65	B35	B36/A53	B37	D63	B38/E77
TS13	100	C41	C42	C49	C43	C44	C45	C46	C47/C35	C48
TS12	80	C21	C22	C23	C24	C25	C26	C27	C28	C29
TS11	80	C31	C32	C33	E51	E52	E53	E54	E55	E56
TS10	80	A11	A12	A13	A14	A15	A16	A17	A18	C34
TS9	80	E11	E12	E13	E14	E15	E16	E17	E18	E19
TS8	80	D11	D12	D61	D13	D14	D15	D16	D17	▲
TS7	80	E41	E71	E72	E73	E74	E42	E43	E75	▲
TS6	80	B21	B22	B23	B24	B25	B51	B26	B27	B52
TS5	80	B61	E31	E32	E33	E34	E35/E76	B62	B63	▲
TS4	60	A21	A22	A23	A24	A25	A26	A27	A73(AC)	▲
TS3	60	A71	A72	A41	D51	E62	D52	E63	E8	D53
TS2	60	D31	D41	D42	D32	A42	D33	D43	D44	D34
TS1	60	E21	B64 (VF1)	E22	E23 (VF4)	E24	B28(VF3)	D61	B39(VF2)	←
							▲VF5 Social media ??			



A6: Space Debris Symposium

Johnson – Matney – Bonnal

The Symposium will address the complete spectrum of technical issues of space debris: measurements, modelling, risk assessment in space and on the ground, reentry, hypervelocity impacts and protection, mitigation and standards, and Space Surveillance.

A6.1: Measurements: Schildknecht – Agapov - Stansbery

This session will address advanced ground and space-based measurement techniques, relating processing methods, and results of space debris characterization.

A6.2: Modelling and Risk Analysis: Anselmo – Matney – Hanada

This session will address the characterization of the current and future debris population and methods for in-orbit and on-ground risk assessments. The in-orbit analysis will cover collision risk estimates based on statistical population models and deterministic catalogues, and active avoidance.

A6.3: Hypervelocity Impacts and Protection: Francesconi – Sen Liu – Schäfer

The session will address passive protection, shielding and damage predictions. Shielding aspects will be supported by experimental and computational results of HVI tests. Use of HVI techniques for debris mitigation.

A6.4: Mitigation and Standards: Cazaux – Klinkrad – Yakovlev

This session will focus on the definition and implementation of debris prevention and reduction measures and vehicle passive protection. The session will also address space debris mitigation guidelines and standards that exist already or are in preparation at the national or international level.

Modifier



3. Space Debris Symposium Toronto 2014

A6.5: Space Debris Removal Issues: Piergentili – Adimurthy – Bérend

This session will address active removal techniques “ground and space based”, review potential solutions and identify implementation difficulties.

A6.6: Space Debris Removal Concepts: Anz-Meador – Kibe – DiPentino

This session will address active removal techniques “ground and space based”, review potential solutions and identify implementation difficulties.

A6.7: Operations in Space Debris Environment, Situational Awareness:

Kelso – Finkleman – Krisko

This session will address the multiple aspects associated to safe operations in Space dealing with Space Debris, including operational observations, orbit determination, catalogue build-up and maintenance, data aggregation from different sources, relevant data exchanges standards and conjunction analyses.

A6.8 (joint with Space Security Committee): Political, Legal, Institutional and Economic Aspects of Space Debris Mitigation and Removal

Biddington – McKnight – Mathieu

This session will deal with the non-technical aspect of space debris mitigation and removal. Political, legal and institutional aspects includes role of IADC and UNCOPUOS and other multilateral bodies. Economic issues including insurance, financial incentives and funding for space debris mitigation and removal. The role of international cooperation in addressing these issues will be considered

A6.9: Modelling and Orbit Determination

Cowardin – Flegel – Lewis

This session will address aspects of space debris orbit determination related to assessment of raw and derived data accuracy, optical measurements processing and modelling and risk analysis of space debris

A6.P: Posters, Bonnal

⇒ Modifications if any to be given to IAF secretary before the end of the week to implement on the web site

New



3. Space Debris Symposium Toronto 2014

Recall of a few basic rules

⇒ *Selection process*

- Check for completeness of what you receive wrt web site
- Be sure all the abstracts submitted to A6 are finally allocated or rejected
- Check equilibrium and logic of your session:
 - Not too many Europeans, nor Americans, nor Chinese
 - No duplication of subjects, at least within one given session
 - Beware the “risky papers”, or choose one more than normal
- Avoid “political” papers or very general roadmaps
- Beware “classical” papers with no news expected
- Normally 9 abstracts per session, but 10 is recommended taking into account 1 or more “risky papers”
- In case of merger between papers, identify the “prime”
- Format should be available by Wednesday
- Posters: as many as you want, provided they are good
 - Dedicated zone
 - Total ≤ 400 for the complete congress
 - Competition for best posters
 - Be careful to follow the request of an author: O, P, or no precision



3. Space Debris Symposium Toronto 2014

Black list (= No show)

A6.1: -

A6.2: -

A6.3: Higashide, Clements, Bauer

A6.4: -

A6.5: -

A6.6: Pisseloup, Zhang

A6.7: -

A6.8: -

Grey list (= Withdrawn)

A6.1: Voelker

A6.2: -

A6.3: -

A6.4: -

A6.5: Weisz, Ilin

A6.6: Alary, Apulsson, Faber

A6.7: Rokni

A6.8: Konert, Palkovitz

⇒ *Naples No-shows:*

⇒ A6.1: Subbarao

⇒ A6.2: Novak

⇒ A6.3: Dongyong Jia

⇒ *Naples Withdrawn:*

⇒ A6.1: Liou

⇒ A6.3: Shannon Ryan, Destefanis, Thurber,
Abrar-UI-Haq Khan Baluch

⇒ A6.5: Pietras, Beibei Wu

⇒ A6.6: Aditya Sharma

No specific message from IPC SG

- Use this information as you wish for your selection
- Suggested to give lower priority



4. Space Debris Symposium Jerusalem 2015

A priori same structure as Toronto 2014 without the Toronto New Session

Structure confirmed today (Appendix 6)

- 7 sessions + 1 joint with Space Security Committee
- Additional session to be decided in March 2015 if needed
- Potential identification of other joint sessions ⇒ None, after discussion

Year	Location	Session 1	Session 2	Session 3	Session 4	Session 5	Session 6	Session 7	Session 8	Session 9	Posters
2010	Praha	G. Stansbery [C]	C. Martin [C]	Adimurthy [R]	J. Hussey [C]	H. Krag [C]					
		S. Kibe [C]	P. Krisko [C]	H. Stokes [C]	F. Alby [C]	V. Agapov [C]					
		T. Schildknecht [R]	L. Anselmo [R]	C. Wiedemann [R]	H. Klinkrad [R]	M. Matney [R]					
2011	Capetown	T. Schildknecht [C]	C. Pardini [C]	S. Meshcheryakov [C]	F. Alby [C]	H. Klinkrad [C]	F. Piergentili [C]				
		V. Agapov [C]	D. McKnight [C]	F. Schaefer [C]	R. Crowther [C]	S. Kibe [C]	V. Kuprianov [C]				
		P. Seitzer [R]	C. Wiedemann [R]	J. Hyde [R]	V. Adimurthy [R]	P. Anz-Meador [R]	M. Mulrooney [R]				
2012	Naples	P. Seitzer [C]	L. Anselmo [C]	J. Hyde [C]	F. Alby [C]	H. Klinkrad [C]	M. Yakovlev [C]	N. Johnson [C]			
		V. Agapov [C]	C. Wiedemann [C]	A. Francesconi [C]	J. Hussey [C]	D. McKnight [C]	K. Suzuki [C]	C. Bonnal [C]			
		T. Schildknecht [R]	T. Hanada [R]	F. Schaefer [R]	F. Piergentili [R]	S. Kibe [R]	C. Mathieu [R]	M. Rudolph [R]			
2013	Beijing	T. Schildknecht [C]	C. Pardini [C]	D. McKnight [C]	F. Alby [C]	V. Adimurthy [C]	P. Anz-Meador [C]	D. Finkleman [C]	K. Suzuki [C]		D. McKnight
		V. Agapov [C]	P. Krisko [C]	A. Francesconi [C]	H. Klinkrad [C]	J. Hussey [C]	S. Kibe [C]	D. McKnight [C]	P. Krisko [C]		C. Bonnal
		P. Seitzer [R]	C. Wiedemann [R]	M. Rudolph [R]	M. Yakovlev [R]	F. Santoni [R]	M. Rudolph [R]	H. Krag [R]	C. Mathieu [R]		
2014	Toronto	T. Schildknecht [C]	L. Anselmo [C]	A. Francesconi [C]	C. Cazaux [C]	V. Adimurthy [C]	P. Anz-Meador [C]	T.S. Kelso [C]	B. Biddington [C]	H. Cowardin [C]	C. Bonnal
		V. Agapov [C]	M. Matney [C]	Sen Liu [C]	H. Klinkrad [C]	F. Piergentili [C]	S. Kibe [C]	D. Finkleman [C]	D. McKnight [C]	S. Flegel [C]	
		G. Stansbery [R]	T. Hanada [R]	F. Schaefer [R]	M. Yakovlev [R]	N. Berend [R]	Di Pentino [R]	P. Krisko [R]	C. Mathieu [R]	H. Lewis [R]	
2015	Jerusalem	H. Cowardin [C]	C. Pardini [C]	J. Hyde [C]	H. Krag [C]	MYS. Prasad [C]	N. Berend [C]	T.S. Kelso [C]	B. Biddington [C]		C. Bonnal
		T. Schildknecht [C]	P. Krisko [C]	F. Schaefer [C]	C. Cazaux [C]	F. Piergentili [C]	S. Kawamoto [C]	D. Finkleman [C]	D. McKnight [C]		
		V. Agapov [R]	S. Flegel [R]	A. Francesconi [R]	A. Kato [R]	F. Santoni [R]	M. Matney [R]	J.C. Dolado-Perez [R]	C. Mathieu [R]		



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A6.4: Mitigation and Standards: Krag – Cazaux – Kato

This session will focus on the definition and implementation of debris prevention and reduction measures and vehicle passive protection. The session will also address space debris mitigation guidelines and standards that exist already or are in preparation at the national or international level.



4. Space Debris Symposium Jerusalem 2015

A6.5: Space Debris Removal Issues: Prasad – Piergentili – Santoni

This session will address active removal techniques “ground and space based”, review potential solutions and identify implementation difficulties.

A6.6: Space Debris Removal Concepts: Berend – Kawamoto – Matney

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Kelso – Finkleman – Dolado-Perez

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A6.P: Posters, Bonnal

⇒ First draft to be given to IAF secretary before the end of the month



5. Actions

Noticeable past actions

- Position Paper on Orbital Debris in 1993, revised in 2000**
- Position Paper SG 5.1 on Space Debris Mitigation in 2006**

Recent past

Publication of the SG 5.5 Space Debris Remediation

- Release on 2 December 2013**
- 550 paper copies distributed to IAA**
- Report accessible on IAA web site**

Contribution to IAA Heads of Agencies Summit in Washington, 9-10 January 2014 (appendix 1 & 2)

- Two presentations:**
 - “The Contribution of IAA Orbital Debris Initiatives Over the Last Twenty Years” by Darren McKnight**
 - “Status Report on Space Debris” by Fernand Alby**
- ⇒ Please, go through them quickly to give the Committee a flavor of the content!**
- ⇒ Both will be annexed to the minutes of meeting of the 19 March**
- ⇒ Good suggestion by Karl Doetsch to have them presented at UNCOPUOS STSC. Action on Chairs.**

Proposal of a Plenary Event for Toronto 2014

- Has not been selected by the SG of the IPC on March 18 (see following page)**



5. Actions

General program overview for Toronto: 7 Plenary Events, 3 HighLight Lectures, 1 Late Breaking News





5. Actions

Plenary Events for Toronto 2014: very tough selection of 7 PE out of 21 proposals



Plenary Programme Selection (4/5)



Following a challenging selection process, the IPC Steering Group asks the IAF Bureau to approve the following selection of Plenary Events and Highlight Lectures:

PE1 - Heads of Agency

PE3 - Commercial Human Spaceflight - Real Programs with Successes and Challenges

PE4 - Fresh Water for All - The Role of Space Assets

PE11 - Inspiration-Innovation-Impact. Global societal challenge as the key driver for space activities: the imperative for a new way to engage stakeholders

PE13 - ISS and beyond - the future of human activity in Low Earth Orbit

PE17 - The Cryosphere in Retreat

PE18 - The Next Generation Plenary – Innovations in Exploration

HLL1 - Chasing a Comet- Recent Results from the Rosetta Mission

HLL8 - HLL of Dr Sullivan, Administrator of NOAA

The third HLL still need to be selected among the following:

2	HLL	Human Spaceflight- An assessment of rationales, opinions, and sustainable pathways for the future of exploration.
3	HLL	Reaching Mars- Challenges in India's Mars Orbiter Mission Design, Planning and Implementation, and the Future Prospects
4	HLL	Technical Achievements of the Chang'E 3 Probe



5. Actions

Ongoing actions

Contribution to SG 5.10 on Orbital Debris Removal: Policy, Legal, Political and Economic considerations

- **Dedicated meeting of the SG this morning!**

New action: SG 5.14 Space Debris Situation Report (Appendix 3 & 4)

- Timing

- **Proposed 22 September 2013**
- **Approved 16 January 2014**
- **Progress report sent to IAA 14 March 2014**
- **First collection of contributions on 19 March 2014**
- **First draft expected for Toronto meeting**
- **Final draft for peer reviewing for Paris meeting in March 2015**
- **Publication by Jerusalem meeting?**

- General description

- **Reference status of the Space Debris problematic, acting as an update of the IAA Position Papers 1993 and Revision from 2001, taking into account the IAA Position Papers on Space Debris Mitigation (SG5.1) and on Space Debris Remediation (SG5.5). Available elements from on-going SG5.10 devoted to Policy, Legal and Economic Issues in Orbital Debris Removal will also be included.**



5. Actions

New action: SG 5.14 Space Debris Situation Report (ctd)

- Study Plan and Membership

Introduction, recall of scope and past studies: C Bonnal & D. Mc Knight	4 pages
Present status: Heiner Klinkrad	10 pages
Measurements: Thomas Schildknecht & Vladimir Agapov	10 pages
Space surveillance & collision: Fernand Alby & Dave Finkelman	10 pages
Reentering space objects: Paula Krisko & Mark Matney	10 pages
Future environment: Paula Krisko	10 pages
Debris mitigation: Mark Matney & MYS Prasad	10 pages
Remediation: Darren McKnight & Seishiro Kibe	10 pages
Protection: Franck Schäfer	10 pages
Legal: Tanja Masson-Zwaan	10 pages
References & Standards: Christophe Bonnal	6 pages
International aspects: Charlotte Mathieu & MYS Prasad	6 pages

- Current status

- As per today, 6 draft paragraph out of 12 have been provided, but only 1 in usable shape
- Coming activities coordinated through LinkedIn forum (TBC)



6. Information

General information

- **Status of ISO Guidelines (see following page)**

Past events since last meeting

- **5th European Workshop on Satellites End of Life, 28 January 2014 (see dedicated presentation)**

Upcoming events

- **3rd European workshop on Space Debris Modeling and Remediation (see following page)**
- **7th IAASS Conference, Friedrichshafen, Germany, 20-22 October 2014 (see following page)**
- **40th COSPAR Scientific Assembly will be held from 2–10 August 2014, in Moscow, Russia.**

Event PEDAS.1: "Space Debris - Responding to a Dynamic Environment"

4 sessions (2 days):

- . Debris Measurements
 - . Debris Environment Modeling
 - . Debris Orbit Dynamics, Cataloging
 - . Debris Mitigation and Remediation, SSA
- **SPACE 2014 Conference (see following page)**

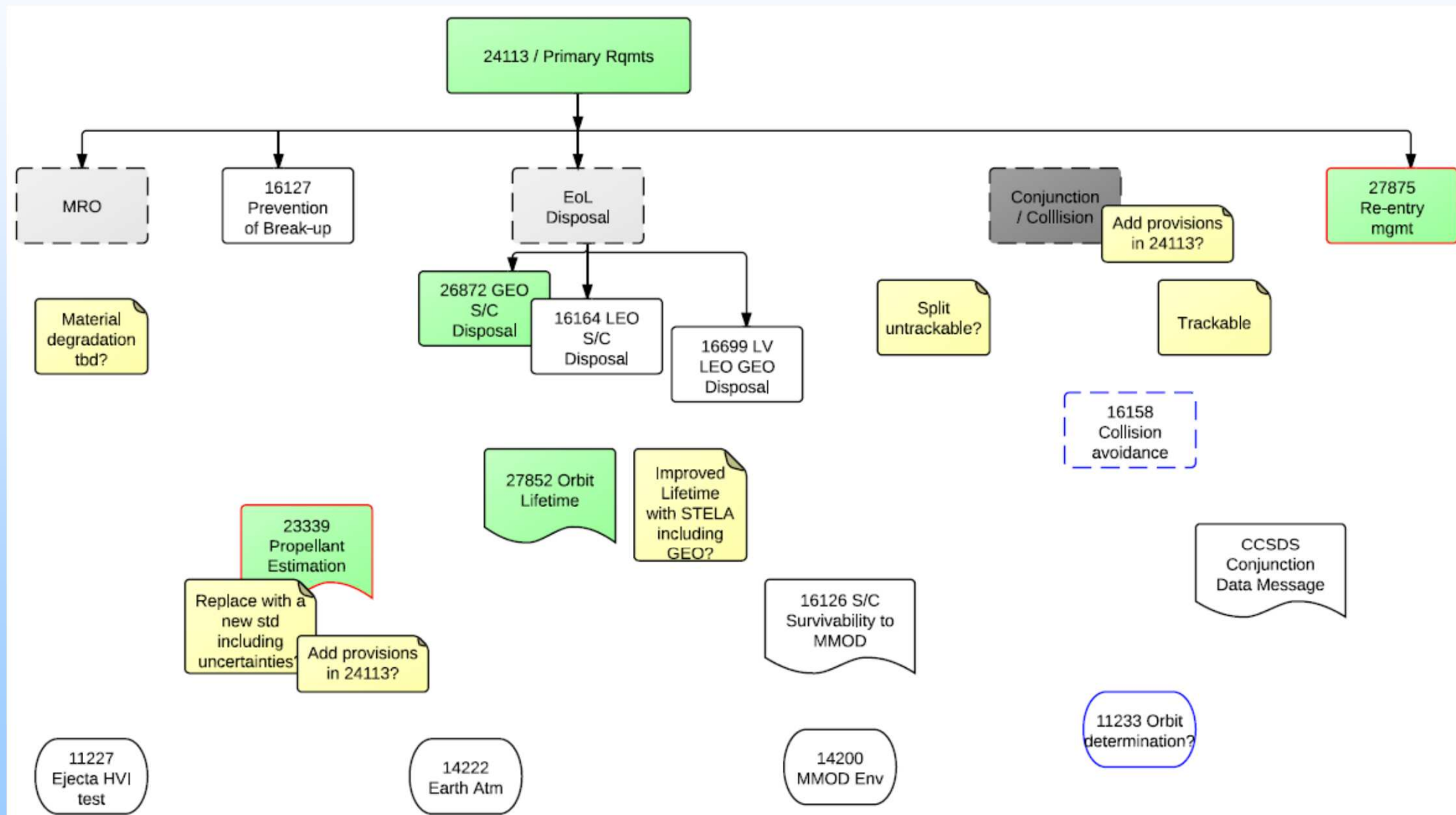
Any Other Business

- **Round Table among participants – Information exchange**

Next meeting: Saturday 27 September 2014, Toronto, 10:00 – 13:00

6. Information

Status of ISO Guidelines





6. Information

General status of the ISO items

- Standards published: 7 (3 **HP**)
 - ISO 24113 - Space Debris Mitigation (**HP**, adopted by ECSS)
 - ISO 27875 - Re-entry risk management for Unmanned S/C and launch vehicle orbital stages
 - ISO 26872 - Disposal of satellites operating at geosynchronous altitude (**HP**)
 - ISO 23339 - Estimating the mass of remaining usable propellant
 - ISO 27852 - Estimation of orbit lifetime (**HP**)
 - ISO 11227 - Test procedures to evaluate S/C material ejecta upon hypervelocity impact
 - ISO 14200 - Guide to process-based implementation of meteoroid and debris environmental models
- Documents reaching FDIS (Final Draft International Standard): 3 (1 **HP**)
 - ISO 14222 - Earth Atmosphere density above 120 km (DIS passed 2012-02-14)
 - ISO 16126 - Survivability of Unmanned Spacecraft against Space Debris and Meteoroid Impacts
 - ISO 16127 - Prevention of Break-up of Unmanned Spacecraft (**HP**)



6. Information

General status of the ISO items

- Documents in DIS (Draft International Standard): 2 (1 **HP**)
 - ISO 11233 - Orbit determination and estimation - Process for describing techniques (TS, DIS review ends 2012-07-27)
 - ISO 16699 - Disposal of orbital launch stages (**HP**, CD/C ends 2012-06-02)
- Documents in CD (Committee Draft): 2 (1 **HP**)
 - ISO 16158 - Avoiding collisions with orbiting objects (TR, to be reinstated for CD/V)
 - ISO 16164 - Disposal of satellites operating in or crossing LEO (**HP**, waiting for CD/V)
- Projects moving to WD: 2
 - ISO 18146 - Design and operation manual for spacecraft operated in the debris environment (Technical Report, **HP**)
 - ISO 16679 - Relative motion analysis elements after LV/SC Separation



6. Information

3rd European workshop on Space Debris Modeling and Remediation

- **Every 2 years in CNES-HQ**
- **16-18 June 2014 – No registration fees**
- **Content similar in principle to last two editions with some add-ons:**
 - Modeling of future debris populations, influence of key parameters,
 - Active Debris Removal, system, sub-systems, GNC, ...
 - Topic of smaller debris, with associated remediation solutions
 - Non technical aspects of debris remediation, legal, insurance, economics, intellectual property, national security, international cooperation...
- **International Program Committee:**
 - ESA-HQ (Luisa Innocenti), ESA-ESOC (Holger Krag), DLR (Manuel Metz), JAXA (Satomi Kawamoto), NASA-JSC (Jer-Chyi Liou), SWF (Brian Weeden) and Roscosmos (Valeriy Trushlyakov), in addition to 5 CNES, HQ (Pascal Faucher), Toulouse (Fernand Alby & Marie-Christine Desjean), Launchers (Jean-Marc Ruault & Christophe Bonnal).
- **Abstracts are welcome until end of March 2014**
- **High quality Posters are also welcome**



International
Academy of
Astronautics

6. Information

7th IAASS Conference

International Association for the Advancement of Space Safety



SPACE SAFETY IS NO ACCIDENT

FRIEDRICHSHAFEN - GERMANY 20-22 OCTOBER 2014

<http://iaassconference2014.space-safety.org>



6. Information

American Institute of Aeronautics and Astronautics and American Astronautical Society

SPACE 2014 Conference

Connecting, Protecting, and Enhancing a Global Society

AIAA SPACE 2014 will examine the impacts of space activity on society. The forum will convene a global conversation around the important role our community plays in enabling a connected culture, monitoring our planet, expanding our boundaries beyond Earth, and advancing technology and innovation to address worldwide opportunities.

We would like a few panelists or speakers from nations representative of those with space capabilities and ambitions to discuss matters that facilitate or inhibit collaboration for mutual benefit and what kinds of cooperation are possible and feasible for "connecting, protecting, and enhancing a global society."

4 - 7 August 2014

Location: San Diego, California

Venue: Manchester Grand Hyatt